CLAIMS:

1. In a computer graphics display system comprising a display monitor, a method of detecting hidden surfaces of a polygon in a display block, the polygon having depth values corresponding to a minimum depth value and a maximum depth value, the method comprising:

partitioning a screen of the display monitor into a plurality of display blocks having one or more layers of pixels;

storing in a z-range buffer minimum and maximum depth values for the layers in the block, the z-range buffer further storing a bitmask value, each bit in the bitmask value associating a pixel in the block to a layer in the block;

comparing a depth value of the polygon with a depth value of a particular layer in the block stored in the z-range buffer; and

identifying visible pixels in the block making up the polygon based on the comparison.

2. The method of claim 1, wherein the polygon in the display block is a triangle.

3. The method of claim 1 further comprising the step of initializing the minimum and maximum depth values of the layers in the block to a depth value corresponding to a background of the block.

4. The method of claim 1, wherein the layers in the block comprise a first layer and a second layer, each pixel in the block being associated with either the first layer or the second layer, the first layer having depth values ranging from a first minimum depth value to a first maximum depth value, and the second layer having depth values ranging from a second minimum depth value to a second maximum depth value.

5. The method of claim 4, wherein the step of comparing depth values comprises determining whether the polygon is located closer to a viewpoint than a first layer.

6. The method of claim 4, wherein the step of comparing depth values comprises determining whether the polygon is further from the viewpoint than the first layer but closer to the viewpoint than the second layer.

7. The method of claim 4, wherein the step of comparing depth values comprises determining whether the depth value ranges of the polygon intersect with the depth value ranges of the first layer.

8. The method of claim 4, wherein the step of comparing depth values comprises determining whether the depth value ranges of the polygon intersect with the depth value ranges of the second layer.

9. The method of claim 1 further comprising the step of updating bits of the bitmask value, the bits corresponding to the pixels in the block making up the polygon.

10. The method of claim 1 further comprising the step of updating the minimum and maximum depth values of a layer in the block.

Sub A2

11. A computer graphics display interface with use with a computer system having a display monitor, the interface comprising:

a memory including a z-range buffer for storing minimum and maximum depth values of one or more layers of pixels of a display block; and

a processor unit coupled to the memory for partitioning a screen of the display monitor into a plurality of display blocks having one or more layers of pixels, comparing a depth value of a polygon in a display block with a depth value of a particular layer in the block, and identifying visible pixels in the block making up the polygon based on the comparison.

12. The system of claim 11, wherein the polygon in the display block is a triangle.

13. The system of claim 11, wherein the layers in the block comprise a first layer and a second layer, each pixel in the block being associated with either the first layer or the second layer, the first layer having depth values ranging from a first minimum depth value to a first maximum depth value, and the second layer having depth values ranging from a second minimum depth value to a second maximum depth value.

14. In a graphics display system having a digital circuit topology having a set of primary input gates and a set of primary output gates, a method of detecting hidden surfaces of a polygon in a display block, the polygon having depth values corresponding to a minimum depth value and a maximum depth value, the method comprising:

storing in a z-range buffer minimum and maximum depth values for the layers in the block, the z-range buffer further storing a bitmask value, each bit in the bitmask value associating a pixel in the block to a layer in the block;

comparing a depth value of the polygon with a depth value of a particular layer in the block stored in the z-range buffer; and

identifying visible pixels in the block making up the polygon based on the comparison.

15. The method of claim 14, wherein the polygon in the display block is a triangle.

16. The method of claim 14, further comprising the step of initializing the minimum and maximum depth values of the layers in the block to a depth value corresponding to a background of the block.

17. The method of claim 14, wherein the layers in the block comprise a first layer and a second layer, each pixel in the block being associated with either the first layer or the second layer, the first layer having depth values ranging from a first minimum depth value to a first maximum depth value, and the second layer having depth values ranging from a second minimum depth value to a second maximum depth value.

18. The method of claim 17, wherein the step of comparing depth values comprises determining whether the polygon is located closer to a viewpoint than a first layer.

19. The method of claim 17, wherein the step of comparing depth values comprises determining whether the polygon is further from the viewpoint than the first layer but closer to the viewpoint than the second layer.

20. The method of claim 17, wherein the step of comparing depth values comprises determining whether the depth value ranges of the polygon intersect with the depth value ranges of the first layer.

21. The method of claim 17 wherein the step of comparing depth values comprises determining whether the depth value ranges

of the polygon intersect with the depth value ranges of the second layer.

22. The method of claim 17 further comprising the step of updating bits of the bitmask value, the bits corresponding to the pixels in the block making up the polygon.

23. The method of claim 17 further comprising the step of the minimum and maximum depth values of a layer in the block.

24. A computer-readable medium comprising:

a program code embodied in the computer readable medium for causing detection of hidden surfaces of a polygon in a display block, the polygon having depth values corresponding to a minimum depth value and a maximum depth value, the computer-readable program segment comprising instructions for performing the steps of:

storing in a z-range buffer minimum and maximum depth values for the layers in the block, the z-range buffer further storing a bitmask value, each bit in the bitmask value associating a pixel in the block to a layer in the block;

comparing a depth value of the polygon with a depth value of a particular layer in the block stored in the z-range buffer; and

identifying visible pixels in the block making up the polygon based on the comparison.

25. The computer-readable medium of claim 24, wherein the polygon in the display block is a triangle.

26. The computer-readable medium of claim 24, wherein the computer-readable program segment further comprises instructions for initializing the minimum and maximum depth values of the

layers in the block to a depth value corresponding to a background of the block.

27. The computer-readable medium of claim 24, wherein the layers in the block comprise a first layer and a second layer, each pixel in the block being associated with either the first layer or the second layer, the first layer having depth values ranging from a first minimum depth value to a first maximum depth value, and the second layer having depth values ranging from a second minimum depth value to a second maximum depth value.

28. The computer-readable medium of claim 27, wherein the step of comparing depth values comprises determining whether the polygon is located closer to a viewpoint than a first layer.

29. The computer-readable medium of claim 27, wherein the step of comparing depth values comprises determining whether the polygon is further from the viewpoint than the first layer but closer to the viewpoint than the second layer.

30. The computer-readable medium of claim 27, wherein the step of comparing depth values comprises determining whether the depth value ranges of the polygon intersect with the depth value ranges of the first layer.

31. The computer-readable medium of claim 27, wherein the step of comparing depth values comprises determining whether the depth value ranges of the polygon intersect with the depth value ranges of the second layer.

32. The computer-readable medium of claim 24, wherein the computer-readable program segment further comprises instructions

for updating bits of the bitmask value, the bits corresponding to the pixels in the block making up the polygon.

33. The computer-readable medium of claim 24, wherein the computer-readable program segment further comprises instructions for updating the minimum and maximum depth values of a layer in the block.

add A3